

Claims

1. A transmitter apparatus for transmitting an information symbol sequence from a first radio station having an array antenna having M ($M > 1$) elements to a second radio station, the transmitter apparatus comprising:

vector control means for producing a plurality of N ($N \leq M$) dimensional vectors depending upon a propagation parameter featuring a propagation channel of between the first radio station and the second radio station; and

vector multiplexing means for producing vector-multiplexed symbol sequences in the number of N multiplexed by multiplying the plurality of N dimensional vectors on a plurality of symbol sequences containing the information symbol sequence;

whereby the vector control means transmits, at the array antenna, the vector-multiplexed symbol sequences set such that, at the second radio station, a particular symbol sequence only is to be received of among a plurality of the symbol sequences whereas other symbol sequences are to be canceled.

2. A transmitter apparatus according to claim 1, further comprising propagation channel analyzing means for producing a propagation channel matrix as the propagation parameter,

the vector control means being to produce a plurality of N dimensional vectors obtained by singular-value decomposition of the propagation channel matrix.

3. A transmitter apparatus according to claim 1, further comprising propagation channel analyzing means for producing a propagation channel matrix as the propagation parameter,

wherein said vector control means produces a plurality of N dimensional vectors obtained by eigen-value decomposition

of the correlation matrix of the propagation channel matrix.

4. A transmitter apparatus according to claim 1, further comprising reference symbol producing means for producing a reference symbol known also to the communicating terminal and propagation channel information receiving means for receiving information about propagation parameter transmitted from the communicating terminal and determining the propagation parameter,

wherein the information about propagation parameter is produced from a propagation parameter which the communicating terminal determined from the reference symbol transmitted from the base station.

5. A transmitter apparatus according to claim 1, wherein the plurality of symbol sequences, in part or all, are symbol-mapped based on modulation schemes different one from another.

6. A transmitter apparatus according to claim 1, wherein the plurality of symbol sequences, in part or all, are spread by code sequences different one from another.

7. A radio communication method comprising:

a step of transmitting, from a communicating terminal to a base station having an array antenna having M elements, a reference signal made up by reference symbols known to the base station;

a step for the base station to calculate a propagation parameter of between the communicating terminal and the base station from the received reference symbols in the number of M and produce a plurality of N dimensional vectors by using same;

a step for the base station to multiply a plurality of

symbol sequences containing a to-be-notified information symbol sequence, by the plurality of N dimensional vectors set such that at the communicating terminal the to-be-notified information symbol sequence only is to be received while other information symbol sequences are to be canceled, and to produce vector-multiplexed symbol sequences multiplexed and in the number of N ; and

a step of transmitting the vector-multiplexed symbol sequences from the base station to the communicating terminal.

8. A radio communication method comprising:

a step of transmitting, from a base station having an array antenna having M elements to a communicating terminal, a reference signal made up by reference symbols known to the communication terminal;

a step for the communicating terminal to produce a propagation channel information symbol sequence containing a propagation parameter of between the communicating terminal and the base station, from the received reference signal;

a step of transmitting the propagation channel information symbol sequence from the communicating terminal to the communication terminal;

a step for the base station to calculate the propagation parameter from the received propagation channel information symbol sequence and to produce a plurality of N dimensional vectors by using an analysis result of same;

a step for the base station to multiply a plurality of symbol sequences containing a to-be-notified information symbol sequence, by the plurality of N dimensional vectors set such that at the communicating terminal the to-be-notified information symbol sequence only is to be received while other

information symbol sequences are to be canceled, and to produce vector-multiplexed symbol sequences multiplexed and in the number of N ; and

a step of transmitting the vector-multiplexed symbol sequences from the base station to the communicating terminal.